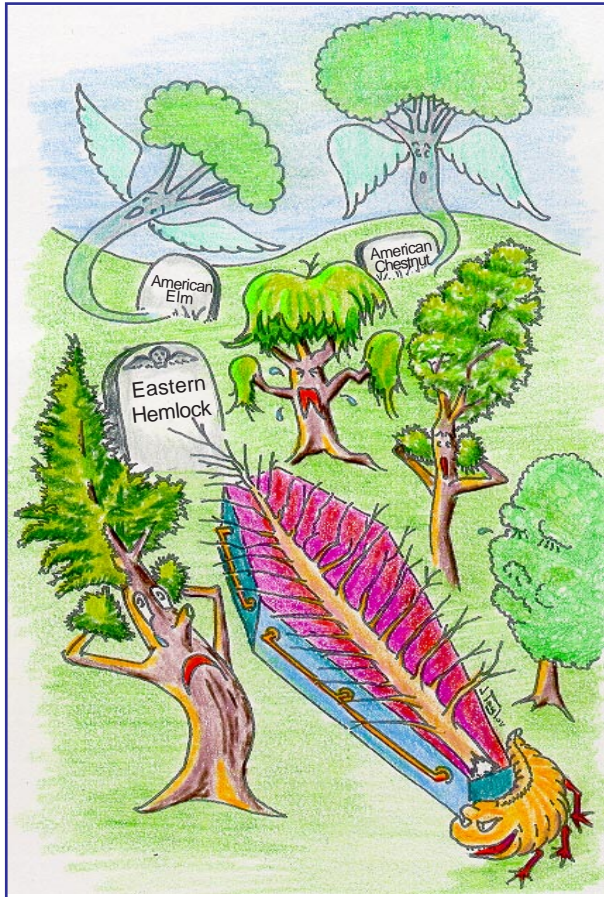


# DOWNSTREAM

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MDC Division of Watershed Management  
to enhance public awareness within the watershed region

## The Woolly Adelgid: And Your Private Forest Land - by Peter Church



Tsuga, we hardly knew ya.

The Adelgid Devil brings Hemlock Hell!  
So the woodsmen say  
Strips the trees to a stick figure shell  
and dooms it with his play

Needles choke with cotton blight  
blocked from root tapped water  
the deepest green turns sickly white  
to wed the devils daughter

Now and then and once again  
as Chestnut and towering Elm  
our forests lose another friend  
to the chains at Dante's helm.

-Anonymous

A tragic story has been unfolding in Massachusetts for the past decade. The stately eastern hemlock tree (*Tsuga canadensis*) is being systematically infested across the state by a foreign invader called the hemlock woolly adelgid. Within a few years of infestation, the once mighty hemlock is reduced to a dying shadow of its former self.

First identified in Massachusetts in 1989, the hemlock woolly adelgid (HWA) is a non-native insect that arrived in western North America in 1924 from Asia. It was reported on the East Coast in the 1950's and has greatly expanded its range by feeding on the eastern hemlock. Today, many communities in Massachusetts have a HWA population. The HWA feeds by sucking sap from the young branches and twigs with the greatest damage occurring in the spring. This prolific insect reproduces twice a year and produces thousands of offspring. By sucking the sap from young branches, the HWA prevents tree growth causing needles to drop prematurely which seriously impairs tree health. Once infested with the HWA, hemlock stands will suffer heavy to complete mortality within a few years.

History is fraught with stories of non-native organisms wreaking havoc on new habitats. Gypsy moths, zebra mussels, purple loosertrife, American chestnut blight and the Dutch elm disease are just a few of the numerous non-native organisms that have affected the native natural landscape. As non-native plants and animals are taken out of their natural ecosystems and introduced into new ones, they are removed from specific environmental population controls such as predators or diseases. Unlike other species of hemlocks in Asia, the eastern and carolina hemlocks are highly susceptible to extensive damage from the HWA.

Researchers at the Connecticut Agricultural Experiment Station have been investigating the possibility of introducing natural predators of the HWA to combat the problem. Dr. Mark McClure discovered a ladybird beetle





Shown at left is a stand of healthy hemlocks. Once they are infested with adelgid, the otherwise long lived tree can be expected to survive only a few years.

(*Pseudoscytnus tsugae*) in Japan that was a natural predator of the HWA. Dr. McClure has successfully propagated the beetles in Connecticut and has released the beetles at test sites around that state. The beetles survived the winter and have reproduced and spread in the hemlock forest. Unfortunately many beetles are needed to deal with the extent of infestation throughout the eastern U.S. One concern that must be carefully investigated before releasing any non-native predator to combat an environmental problem is whether the predator can have the potential to do more harm than good in that natural community. ♀

Peter Church is the director of Natural Resources at the MDC Division of Watershed Management.

#### Reference;

McClure, M.S., 1995, Using natural enemies from Japan to control hemlock woolly adelgid. *Frontiers of Plant Science*.



To identify if a hemlock tree has been infested by the HWA, look underneath the branch at the base of the needles. The small white egg masses of the insect are visible and look like the tips of small cotton swabs.

## What Can You Do

### To Protect Your Trees? - by Joe Kowalski

**B**ecause hemlock woolly adelgid (HWA) can damage trees so quickly, it is important to detect infestations early and to implement a management program immediately. It is best to have your hemlock trees evaluated and diagnosed by a professionally certified arborist before any control measures are considered. Hemlocks growing in ornamental landscape settings can be protected from the HWA by using an Integrated Pest Management system. This involves following the advice of a certified arborist and performing a combination of cultural, chemical and biological control measures.

The homeowner can perform some of these measures but a licensed professional must legally perform others, such as application of certain insecticides.

#### Cultural Control Measures

*Reducing invasion by adelgids:* It is recommended that bird feeders *not* be placed in or near hemlock trees as birds are often carriers of HWA. Care should be taken when moving plants, logs, firewood, or bark mulch from infested areas onto uninfested property, especially from March through June when adelgid “crawlers” are abundant. Cleaning vehicles, clothing, etc. after visiting forests, parks or other properties with infested hemlocks is also advisable during this period.

Infestations of adelgid often start on larger hemlocks. When such a tree becomes infested, it can serve as a “launch pad” for adelgid eggs and crawlers. Selective removal of these heavily infested trees will retard the establishment of new infestations.

*Improving tree vitality:* Trees that are growing in poor sites or experiencing stress from drought or other agents succumb to adelgid attack more quickly. Maintaining good growing conditions can play an important role in the survival of urban hemlocks. During periods of drought, trees should be watered as often as needed to ensure that they receive 1 inch of water per week (including rainfall) over the area within the dripline of the tree. Water should be applied slowly so that the roots will be soaked thoroughly.

Pruning may also be of some value in improving hemlock health. Removing dead and dying branches and limbs will promote new growth and allow more light to reach the healthy foliage. Applying fertilizer may improve the vitality of uninfested trees, fertilizing infested hemlocks is currently not recommended.

*Continued on Page 3*

Continued from Page 2

**Mechanically removing adelgids:** Intentionally dislodging eggs and crawlers from hemlock twigs by directing a strong stream of water at infested branches periodically during April through June may be of some value. Most of the dislodged adelgids are unable to find their way back onto the tree. This may prove especially valuable on smaller trees or hemlocks that have been trimmed into foundation plants or hedges.

**Planting resistant hemlock species:** The use of Japanese and western hemlocks will reduce the impact of the adelgid in the ornamental landscape.

## Chemical Control Methods

The use of chemical pesticides is an essential component of any integrated approach to managing the HWA. While cultural control methods can significantly reduce adelgid numbers, infested trees are usually unable to survive for more than a few years unless pesticides are applied. The initial decision on whether or not to use chemical control measures should consider the value of the trees relative to the anticipated cost of protecting them over the long term. It may be advisable to focus on individual trees or groups of trees that have special value or significance on the property. This may be more successful than an overly ambitious approach of trying to save every tree at first, only to lose them all when the overwhelming effort is discontinued.

**Applying pesticide sprays:** Several pesticides are registered for control of the HWA. Some are available for homeowner use, while others can only be applied by a licensed arborist. These pesticides have a relatively short life in the environment, therefore treating an uninfested tree offers little or no protection from invasion by the adelgid.

The application of pesticides can be performed many ways. The most common and effective method is thoroughly drenching the hemlocks with horticultural oil, or an insecticidal soap. Treating larger trees with this method is more difficult and hence, less effective.

**Applying pesticides by stem injection:** Introducing concentrated chemical pesticides into the stem of the infested tree by injection can control the adelgid on trees that are very tall, growing in areas inaccessible to spray equipment, or where spraying is undesirable such as near waterways or in high pedestrian traffic areas. The injection technique involves drilling small holes into the root flares of the tree and inserting pressurized plastic capsules containing a concentrated liquid pesticide. The pesticide then moves into and up the tree where it is ingested by feeding adelgids. However, the tree must be healthy enough to provide sap flow.

**Applying pesticides by soil injection:** The soil surrounding the infected tree is drenched or injected using a hydraulic needle. The pesticide is then taken up by the roots of the tree and distributed throughout. This treatment does not involve wounding the tree (which can add more stress) as does the trunk injection technique.

## Biological Control Measures

In Japan, where the insect originated, there are effective natural enemies including ladybird beetles, green lacewings, mites and flies. The potential of these and other arthropods as biological control agents is now being evaluated by scientists in this field. It is the hope that someday they may provide a safe, complete control measures alone or in combination with the other techniques.💧

Joe Kowalski is the MDC Natural Resources Arborist at the Wachusett Reservoir.

To learn more about the woolly adelgid, visit: [www.fs.fed.us/na/morgantown/fhp/hwa/hwasite.html](http://www.fs.fed.us/na/morgantown/fhp/hwa/hwasite.html)



Downstream is produced by the Metropolitan District Commission/Division of Watershed Management of The Commonwealth of Massachusetts. Our goal is to inform the public about Watershed Protection issues and activities, provide a conduit for public input, and promote environmentally responsible land management practices.

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A reader asks:

**Q:** Why is boating allowed on the Quabbin Reservoir and not on the Wachusett Reservoir?

**A:** Limited boating is allowed on the Quabbin and not on the Wachusett for several reasons. The Quabbin Reservoir is 6 times larger than Wachusett and the greater volume is better able to compensate for pollutants that may be released and even then, boats are subject to restrictions and are allowed at only three carefully monitored access points that are well away from the intake. Also, water from the Quabbin Reservoir must travel a great distance via aqueduct to the Wachusett. The time and natural processes involved in this also provide a greater opportunity for the water quality threat to dissipate. Since the Wachusett Reservoir is much closer to the point of distribution there is significantly less time and distance to mitigate any pollution risks posed by boating.

This newsletter is published twice yearly and includes articles of interest to landowners and residents of the MDC Division of Watershed Management watershed system communities. Please contact us if you wish to learn more about programs and assistance available to help landowners. We value the contribution your well cared for land provides and welcome the opportunity to work with you. Please send us questions or comments which we will address in subsequent newsletters. Our address is:

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The Woolly Adelgid	1
<i>Information about this hemlock threat</i>	
What Can You Do	2
<i>Steps to confront adelgid infestation</i>	
For Your Information...	4

TO:



**A tranquil day in the Wachusett Reservoir Watershed.**